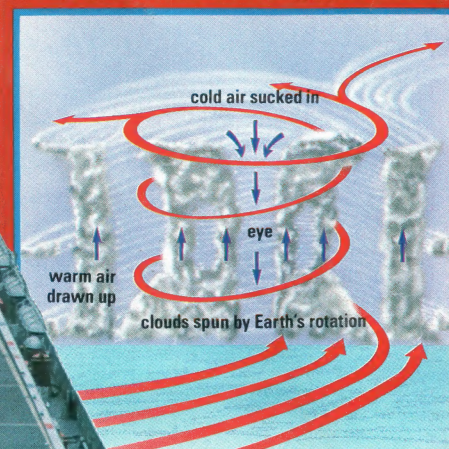


QUEST

ADVENTURES IN THE WORLD OF SCIENCE

Q War at sea – ships, submarines, missiles



Q How were the oceans formed?

Q Killer shark – the real 'Jaws'

Q The world of air-sea rescue

Q Untamed power – the violence of the seas

Q Underwater explorers

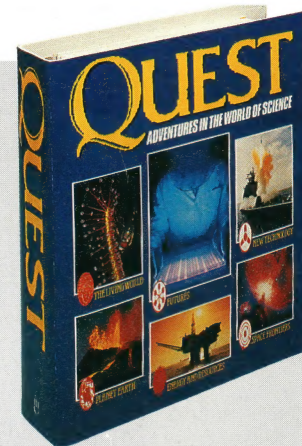
Q Harvesting the oceans

Q Patrol of the deep – bizarre sea creatures

THE OCEANS 1

QUEST

CONTENTS 1



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PLANET EARTH

IN THE BEGINNING

1-2

Birth of the oceans — the continental shelf — volcanic islands — coral reefs — underwater mountains

THE VIOLENT SEAS

3-4

Wind fury and wave power — anatomy of a hurricane — killer waves — the Bermuda Triangle — waterspouts

THE LIVING WORLD

SHARK ATTACK

1-2

The great white — selecting its victim — worst mass attack — shark spotter — the man who survived

WONDERS OF THE DEEP

3-4

The female with the luminous head — the male who bears the babies — the fish filled with blue gas — and more

NEW TECHNOLOGY

WEAPONS AT SEA

1-4

Sea-skimming missiles — tracking Exocet — Seawolf — *Nimitz* and *Invincible* — Polaris and Trident

RESCUE AND SURVIVAL

5-6

The fastest lifeboats — Wessex and Sea King helicopters — Zeebrugge — tips for ocean survival

FUTURES

PROBING THE DEPTHS

1-4

The scuba diver — how the aqualung works — the 'narks' and the 'bends' — saturation and atmospheric diving — submersibles — robots — exploring the *Titanic* — the diver's 'astronaut' suit — underwater cities

ENERGY AND RESOURCES

WEALTH OF THE OCEANS

1-4

Minerals under the sea — plundering the ocean's resources — farming for fish — deep sea drugs — pollution, the world's great dilemma — tuna and whale scandals — the sea's most valuable resource

Cover The British light aircraft carrier, HMS *Invincible*.
Richard Cooke

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- Q Earth and the Milky Way
- Q How a star is born



- Q Survival in space
- Q Spy in the sky
- Q Shuttle service to the stars
- Q The outermost planets
- Q Star Wars — will it happen?
- Q Telescopes for the future
- Q Manned missions to Mars
- Q Moon-walk

MAN IN SPACE 2

QUEST

CONTENTS 2



PLANET EARTH

A PLACE IN THE UNIVERSE

5-6

Earth in the Solar System – the Milky Way – how the Earth was created – galaxies and the Universe – meteorite bombardments – death of the dinosaurs

THE LIVING WORLD

SURVIVING IN SPACE

5-6

Training astronauts – weightlessness – zero-gravity and its effect on the human skeleton – working in space



NEW TECHNOLOGY

FLYING THE SHUTTLE

7-8

The re-usable spacecraft – using manned manoeuvring units in space – Shuttle missions

STAR WARS

9-10

X-ray lasers – interceptor rockets – rail guns and particle guns – heat seeking sensors – killer satellites



SPACE FRONTIERS

MOON SHOT

1-2

Man's first steps on the Moon – the Apollo spacecraft – exploring the Moon's surface – splashdown to Earth

THE OUTER PLANETS

3-4

Jupiter – Saturn – Uranus – Neptune – Pluto – multi-coloured atmospheres and gassy blankets – colliding worlds

MARS – MAN'S NEXT BASE

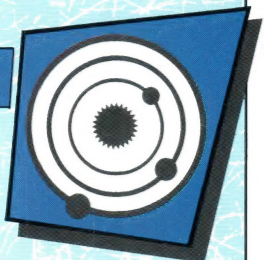
5-8

Space flights to the Red Planet – robot probes on Martian soil – the Mars Observer craft – future colonization

LIFE OF A STAR

9-10

The stellar giants – black holes and supernovas – death of the Sun



FUTURES

SPY IN THE SKY

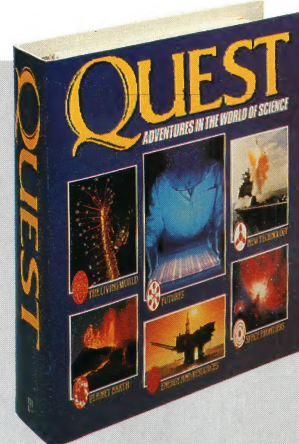
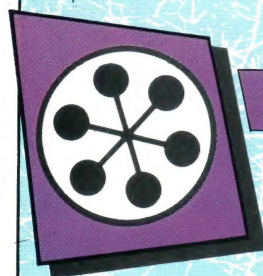
5-6

Mapping the Earth's resources – weather predictions – artificial 'stars'

TELESCOPES FOR TOMORROW

7-8

The all-seeing tools of astronomy – decoding cosmic messages – radio telescopes



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ADVENTURES IN THE WORLD OF SCIENCE

Disc versus tape – the audio visual revolution



The world of TV and radio

Telephones for the future

Modern mail – and facts about fax

How animals converse

Satellites – relaying messages through space

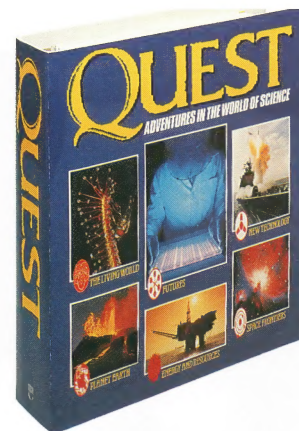
Inside print technology

Waiting for alien messages

COMMUNICATIONS 3

QUEST

CONTENTS 3



THE LIVING WORLD

ANIMAL CHAT

7-8

Secret signs and signals – dancing honeybees – teaching chimps to communicate – talking dolphins – the song of the humpback whale – soldier ants and pheromones

NEW TECHNOLOGY

INSIDE RADIO AND TELEVISION

11-14

Radio broadcasting – AM and FM – varying wavelengths – combining sound and vision – cable and satellite TV – giant-sized and miniature screens

THE PRINT BUSINESS

15-16

Reproducing colour – screening dots – how the printed word reaches the page – hot metal versus computer typesetting – printing by laser – desk-top publishing

AUDIO VISUAL

17-20

How records and tapes are made – video and the future of VHS – CD players – music by laser – the rise of digital audio tape – perfect sound



SPACE FRONTIERS

MESSAGES FROM THE SKY

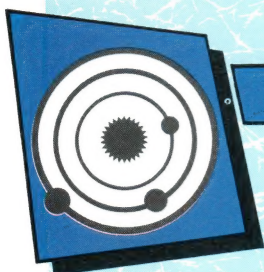
11-12

Navigation from space – using transmission satellites – how messages are received – what are Molniya and Intelsat? – in-car satellite links

IN SEARCH OF E.T.

13-14

Waiting for alien messages – choosing the right frequency – the Arecibo pictogram – Pioneer and Voyager space probes – interpreting the language



FUTURES

ELECTRONIC MAIL

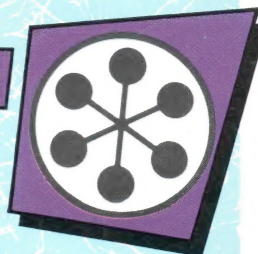
9-10

The automatic post office – sorting by dots – computer links – fax machines and telex – exchanging information – shopping by phone

THE TELEPHONE REVOLUTION

11-14

Cordless phones and translation systems – analogue and digital signals – radiophones and answering machines – optical fibre – videophones



Cover 'Communications: The State of the Art' Steven Hunt/Image Bank
Michael Jackson Rex Features

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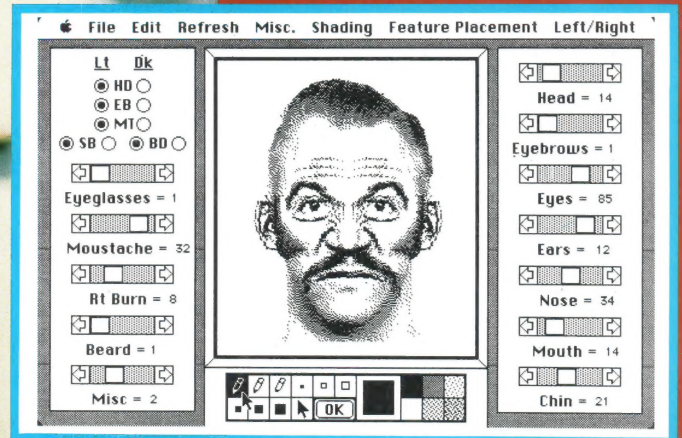
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FACT FILES ON:

☐ Policing the violent 90s



☐ New ways to identify the criminal

☐ Guns – and the science of ballistics

☐ Fraud and forgery

☐ Drugs deterrents

☐ Hijack and terrorism

☐ Murder – the victims and assailants

☐ Computer-age law enforcement

CRIME BUSTERS

4

QUEST

CONTENTS 4



PLANET EARTH

THE DRUGS MENACE

7-8

Major drugs producing areas – the big three (heroin, cocaine and marijuana) – how drugs are smuggled – catching the dealers

THE LIVING WORLD

MURDER ONE

9-12

Establishing the cause of death – role of the pathologist – estimating time of death – deadly poisons – post mortems – rogues gallery

HIJACK!

13-14

Profile of a hijack – saving the hostages – the Stockholm Syndrome – the Iranian Embassy siege – bargaining ploys – role of the SAS



NEW TECHNOLOGY

FRAUD AND FORGERY

21-22

Catching the counterfeiter – computer crime – forging the 'great masters' – carbon dating and the Turin shroud

COMPUTER-AGE POLICING

23-24

Using technology to stop crime – HOLMES and the Police National Computer – traffic monitoring – international policing

GUNS AND BALLISTICS

25-26

Inside a gun barrel – profile of a pistol – identifying the killer bullet – gun calibres – assorted criminals' weapons



FUTURES

DANGER PATROL

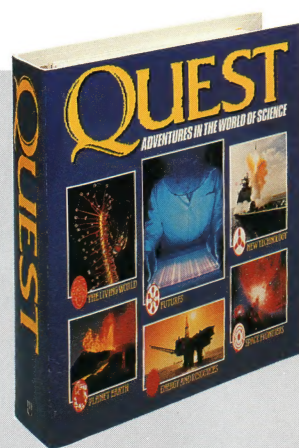
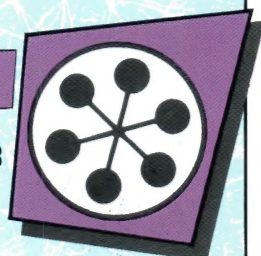
15-18

Policing a riot – protective materials – tear gas – plastic bullets – controlling football crowds – defusing terrorist bombs

IDENTIFYING THE CRIMINAL

19-22

Photofits and videofits – fingerprints – dentistry and blood types – lie detectors – DNA – first genetic conviction



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ADVENTURES IN THE WORLD OF SCIENCE

- ☐ Homes for the future
- ☐ Animal society
- ☐ Urban transport
- ☐ Sewage systems – how they work
- ☐ Inner city pests
- ☐ Energy for all –

☐ Solving the population crisis



CITIES AND COMMUNITIES

QUEST

CONTENTS 5



PLANET EARTH

POPULATION OVERLOAD

9-10

Overcrowded capitals – the meteoric rise of Mexico City – the Chinese solution – feeding the Third World – shanty towns

THE LIVING WORLD

URBAN PARASITES

15-16

The common house fly – the bluebottle – cockroaches – killer rats – house mice – scavenger birds – disease carriers

ANIMAL KINGDOMS

17-20

Ant society – elephant herds – monkeys and apes – the amazing meerkats – packs of wolves – birds and fishes – family units



NEW TECHNOLOGY

GETTING ABOUT TOWN

27-30

Modern buses and trams – unmanned tube trains – the London Docklands railway – cable cars – the floating train – taxis for the future

THE WASTE CYCLE

31-32

Underground sewage – making waste safe – average water consumption – anatomy of a sewage plant – creative use of effluents

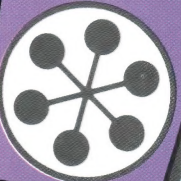


FUTURES

BUILDINGS FOR THE FUTURE

23-26

Polluted cities – planning a new town – unusual houses – underground homes – geodesic domes – the solar house – 'grow your own home'

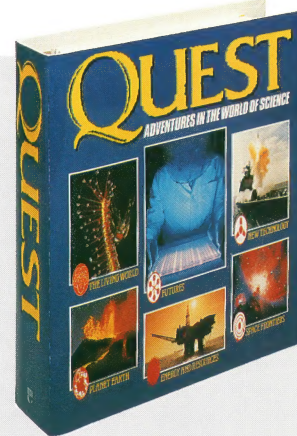


ENERGY AND RESOURCES

POWER TO THE PEOPLE

5-8

Gas rigs – 'the intelligent pig' – how electricity is generated – nuclear power – the Chernobyl disaster – alternative energy sources



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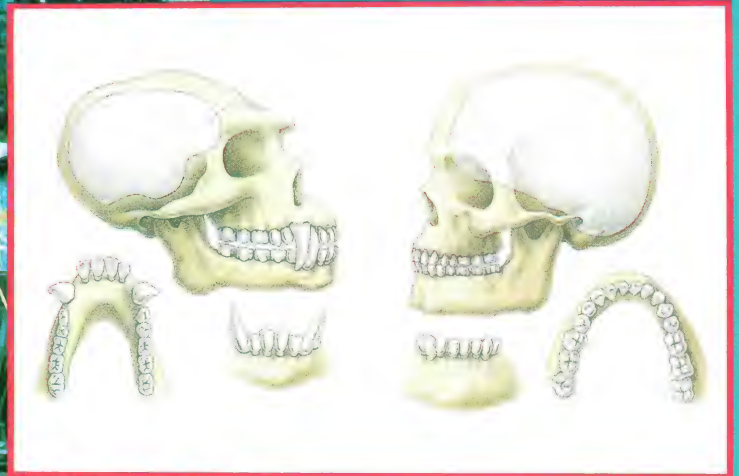
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- Is Man his own worst enemy?
- Lifeforms billions of years ago
- Cells – building blocks of life
- Man learns to walk and talk
- Test-tube babies and cloned animals
- Everyday life in a space station
- Beyond the human being

LIFE FORCES 6

QUEST

CONTENTS 6



PLANET EARTH

FOUR BILLION YEARS BC

11-12

Organic molecules in the Earth's gases – chemical reactions triggered by Nature – single-cell life – cell divisions and mutations

SMALL BEGINNINGS

13-14

The first fossils – jawless fish – life on land begins – resilient cockroaches – death of the dinosaurs – Man appears

THE LIVING WORLD

THE EVOLUTION OF MAN

21-24

The oldest footprints – Man stands up – making tools and hunting for food – early settlers – population explosion



NEW TECHNOLOGY

CLONE ZONES

33-36

Genetic engineering – cloning plants – playing God – frozen for the future – replacement surgery – Frankenstein monsters

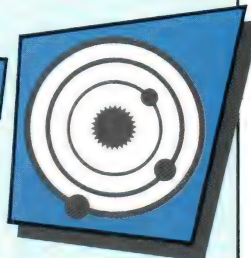


SPACE FRONTIERS

A HOME IN SPACE?

15-16

Without gravitation – artificial day and night – space foods – recycling waste – radiation hazards – space colonies

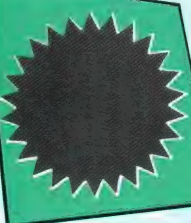


ENERGY AND RESOURCES

THREAT TO LIFE

9-12

Endangered species – the end of the rain forests – burgers instead of trees – creating deserts – the greenhouse effect – acid rain



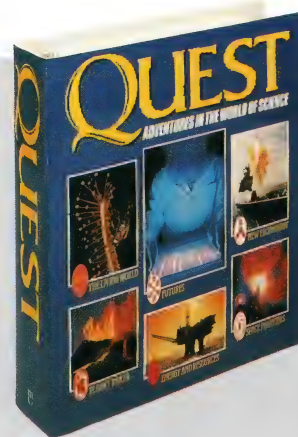
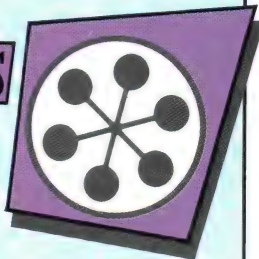
FUTURES

THE MAN MACHINE

27-30

Cars made by robots – machine scientists – sperm and cell banks – living in a box – bionic man – bio-chips

Cover Robot car welders



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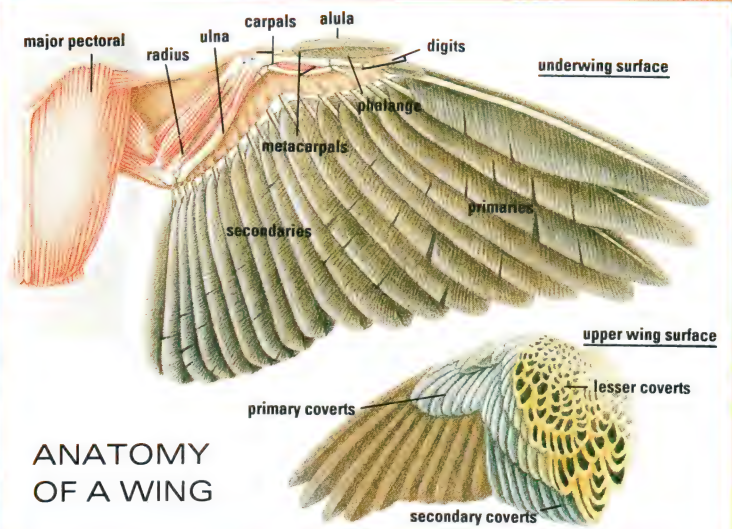
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ADVENTURES IN THE WORLD OF SCIENCE

- Testing planes - from wind tunnel to simulator
- Computer controlled cockpits
- Into the future - invisible aircraft
- Sky wars
- The vertical flyers
- Floating and gliding
- Why planes fly

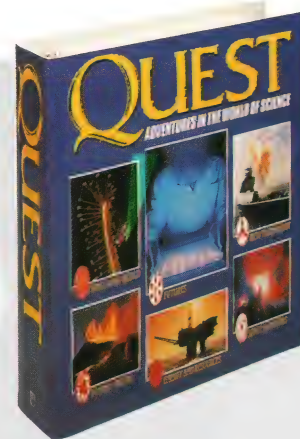


- Nature's flying machines

FLIGHT 7

QUEST

CONTENTS 7



THE LIVING WORLD

NATURE'S FLYING MACHINES

25-28

How birds fly – wing shapes – flying insects – globetrotting butterfly – bird navigation – seeing with the ears – bats and homing pigeons



NEW TECHNOLOGY

SKY WARS

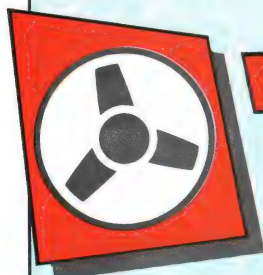
37-38

Fighters into bombers – cranked-arrow wings – dual-role fighters – short take-off and landing – missile systems – Exocets – falling from the sky

FLIGHT 2000

39-42

Flight-data helmets – voice control – thought control – ejector seats – invisible planes – lighter materials – Stealth aircraft



FUTURES

FLYING COMPUTERS

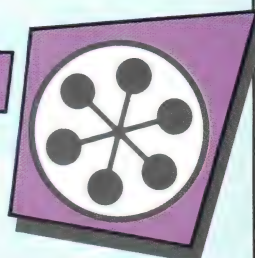
31-32

Fly-by-wire – alpha-floor protection – optical control systems – the black box – fault display systems

TEST PILOT

33-34

Out of the wind tunnel – engineering simulators – heat-sensitive paints – weather watch



ENERGY AND RESOURCES

WHAT GOES UP

13-14

The principles of flight – air speed – how to reduce drag – 'pitch, roll and yaw' – jets versus propellers – the world's busiest airport

LIGHTER THAN AIR

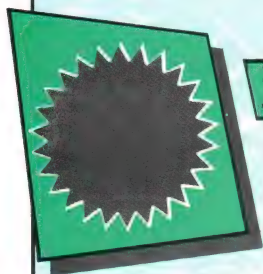
15-18

Hot-air balloons – Hindenburg disaster – steering airships – gliders and hang gliders – balloons in use

ROTOR FORCE

19-20

Vertical take-off – giant choppers – aerial hovercraft – controlling a helicopter – tilt-rotors – military uses



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Cover: Flight simulator for F-15E McDonnell Douglas Corporation

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

Animal attack and self-defence



Satellite killers

Uranium, plutonium and chain-reactions

The Nuclear Bomb

What happens if the bomb falls...

Chemical warfare

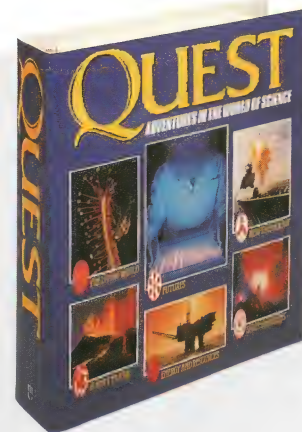
Crossbow hunters

Anti-tank weapons

WEAPONS 8

QUEST

CONTENTS 8



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THE LIVING WORLD

THE PREDATORS

29-32

Killing to survive – the big cats – danger in the water – stings and shocks – deadly reptiles – death by suffocation – fangs and poison

NEW TECHNOLOGY

BOW HUNTER

43-44

High-tech archery – the revolutionary compound – modern arrows – today's technology and the crossbow – the crossbow pistol

COUNTER ATTACK

45-48

Anti-tank missiles – tank armaments – armour-piercing shells – air attacks – methods of subterfuge – stealth technology – complex ECM systems

THE NUCLEAR AGE

49-52

Multiple warheads – measuring in megatons – nuclear explosions – theatre nukes – tactical weapons – neutron bombs – long range attacks

SPACE FRONTIERS

SATELLITE KILLERS

17-18

ASAT systems – exploding interceptors – air launched missiles – particle beam weapons – orbiting space mines – laser beam attack

FUTURES

CHEMICAL WARFARE

35-36

The poor man's deterrent – nerve gases – binary gases – biological weapons

IF THE BOMB FALLS ...

37-38

The fatal effects of fallout – a changing world climate – the dangers of starvation – the end of civilization

ENERGY AND RESOURCES

CHAIN REACTION

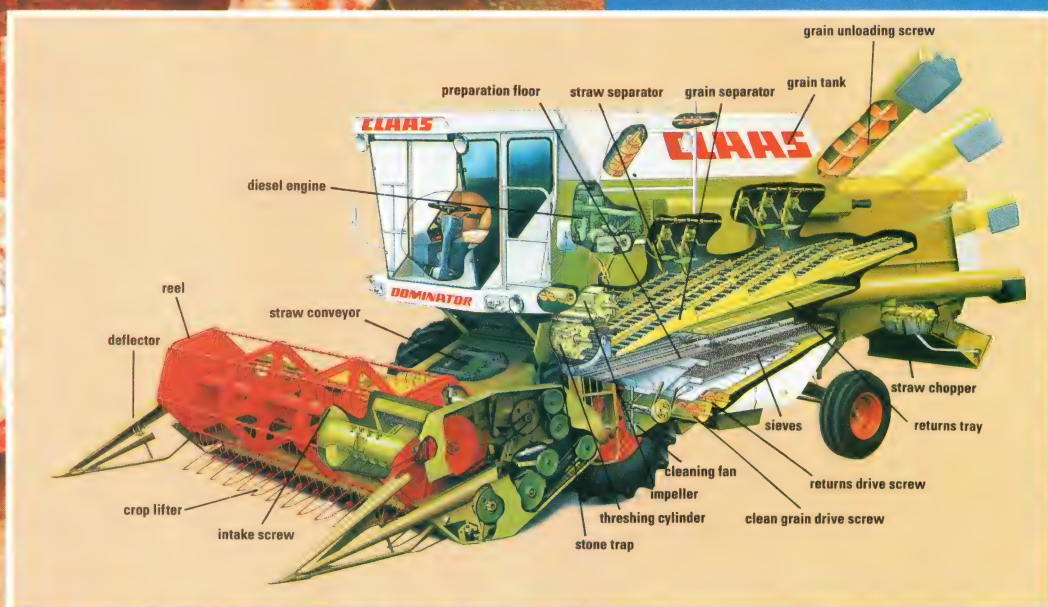
21-22

Neutrons, protons and electrons – uranium 235 – splitting the atom – uranium enrichment plants – plutonium production – the ultimate test

QUEST

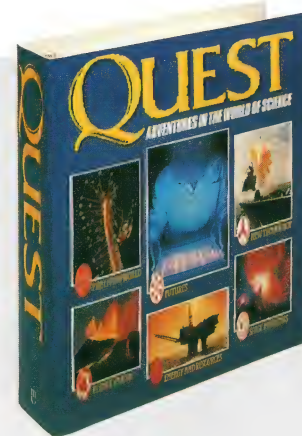
ADVENTURES IN THE WORLD OF SCIENCE

- ❑ Vital nutrients
- ❑ Food irradiation
- ❑ Animal's strange eating habits
- ❑ Battery farming
- ❑ Disease-resistant crops
- ❑ Additives and antibiotics
- ❑ Bar codes de-coded
- ❑ Food preservation
- ❑ Automation and the computerized cow



QUEST

CONTENTS 9



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PLANET EARTH

TRAINED TO SURVIVE

15-18

Soldier's survival pack — effects of dehydration — catching game in the wild — earth ovens — survival at sea

THE LIVING WORLD

WEIRD DIETS

33-34

Animals' strange eating habits — immunity to poison — vegetarian vultures — insects that eat their mate — regurgitating food — worm casts

NEW TECHNOLOGY

INTENSIVE FARMING

53-56

Battery hens — meat production — boosting growth — automated milking — fish farms — biological controls

PROCESSES FOR PRESERVATION

57-58

Yeasts and moulds — bacteria — food spoilage — heat treatments — drying techniques — blast and plate freezing — food irradiation — megarads

FUTURES

SCI-FI FOODS

39-40

Concentrated protein from clover — turning vegetables into milk in the lab — techniques for disease-resistant crops — hi-tech greenhouses

SUPERMARKET 2000

41-42

Bar codes — micro-computers and flat-bed scanners — changing price lines — up-dating stock records — cheque machines — shopping with cards

ENERGY AND RESOURCES

FUEL FOR LIFE

23-26

The importance of protein — different fats — sugary and starchy carbohydrates — vital vitamins

TIPPING THE BALANCE

27-28

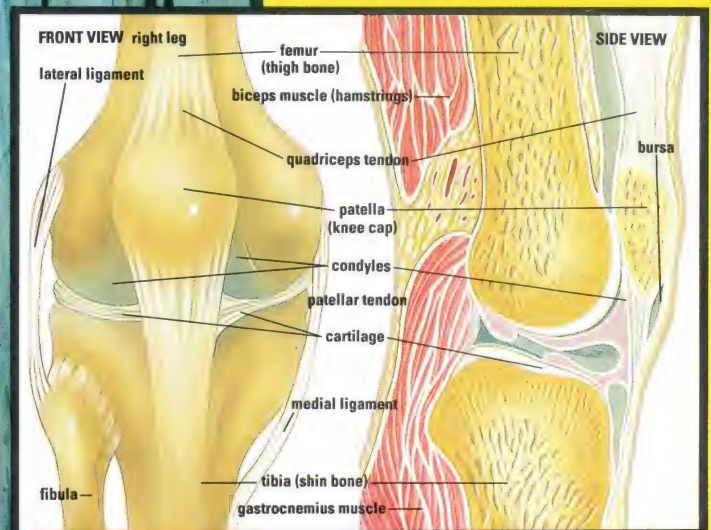
Two sides of the coin — food mountains and famine — food adulteration — a mouthful of additives — bloating poultry with water — antibiotics in meat

Cover Fish plays a vital role in the Eskimo's diet (see Energy and Resources 23). The combine harvester (inset) revolutionized the reaping of grain (see New Technology 54)

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

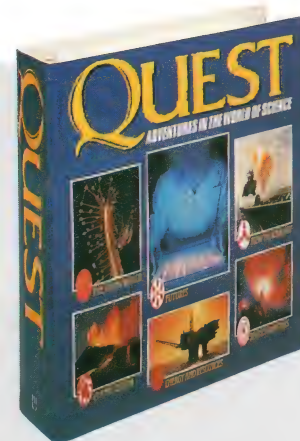
- High altitude hazards
- Breeding champion animals
- Revving up racing cars
- Analyzing performance
- Muscle power
- Anatomy of a ski
- Surfing skills
- Eating to win



- Injuries – causes and cures

QUEST

CONTENTS 10



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PLANET EARTH

MAN AGAINST NATURE

19-22

Conquering mountains – oxygen at high altitudes – physical adaptation – slalom and downhill skiing – how a ski is made – danger of avalanche – potholing – latest equipment

CONQUERING THE WAVES

23-26

Wave power – body surfing – styles of board – aerodynamics of windsurfing – water skiing – dynamic balance – shooting the rapids – rowing – lever and fulcrum

THE LIVING WORLD

BREEDING THOROUGHBREDS

35-36

Breeding for success – new bloodlines – in-breeding – pedigrees – stud farms – champion greyhounds – hot-shot pigeons – planned pairings

SPORTING HAZARDS

37-38

Overtraining and injury – muscle tears and strains – anatomy of a knee – stress fractures – avoiding damage – warming up – laser therapy

NEW TECHNOLOGY

HIGH PERFORMANCE EQUIPMENT

59-60

Multi-gym – weight chains and cams – Hydraulic machines – computer analysis – artificial playing surfaces – photo finish cameras – footwear

POWER RACING

61-64

Maximizing engine power – electronic turbochargers – super-lightweight chassis – braking systems – carbon fibre discs – four-wheel drive – stepless gear boxes

ENERGY AND RESOURCES

THE TRAINED BODY

29-32

Strength training – increasing endurance – reaction times – stretch receptors – balance and co-ordination – momentum and force – energy reserves – carbohydrate loading

Pack cover: monoskiing; 3D computer breakdown of a gymnast's movements; **Fact file cover:** anatomy of the right knee; climbing the sheer face of Manic Strain

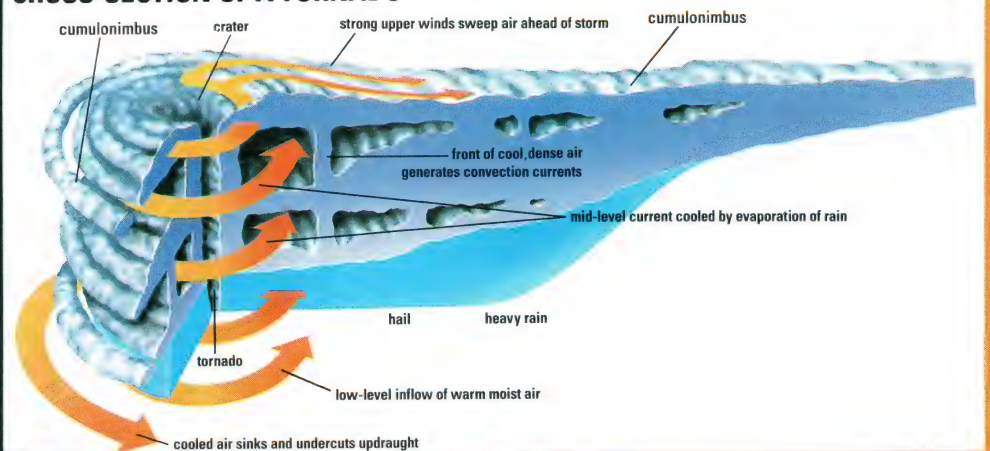
QUEST

ADVENTURES IN THE WORLD OF SCIENCE



- ☐ The troposphere
- ☐ Major wind belts
- ☐ Depressions and anticyclones
- ☐ Cloud types
- ☐ Manipulating weather
- ☐ Weather satellites
- ☐ Synthesizing weather data
- ☐ Photovoltaic cells
- ☐ Violent storms

CROSS-SECTION OF A TORNADO



WEATHER

11

QUEST

CONTENTS 11



PLANET EARTH

UNDERSTANDING WEATHER

31-32

Solar radiation — the troposphere — tropical heat — effect of the Earth's rotation — trade winds

NATURE'S FORCES

27-30

Tropical storms — hurricane winds — tornadoes — dust devils — white-outs — electric storms

ELEMENTS IN ACTION

33-36

Weather systems — movement of air masses — depressions — anticyclones — classifying clouds — dew point

THE LIVING WORLD

HIGHS AND LOWS

39-40

Summertime crime — SAD syndrome — hormone levels — positive effects of negative ions — why sun is fun



NEW TECHNOLOGY

COPING WITH THE COLD

65-66

Snow busters — salting the roads — monitoring systems — insulated clothing — waterproof fabrics — space blankets — hypothermia

FORECASTING

67-70

Data collection — tracking balloons — satellite transmissions — radar networks — automatic buoys — electromagnetic radiation



ENERGY AND RESOURCES

NATURAL POWER

33-34

Wind-powered ships — solar panels — the photovoltaic cell — modern windmills — cruising on jet streams — biofuels

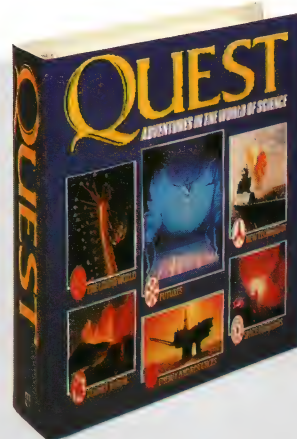


FUTURES

MANIPULATING WEATHER

43-44

Inducing rainfall — consequences of pollution — the 'greenhouse effect' — UV rays — depleted ozone levels



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ADVENTURES IN THE WORLD OF SCIENCE

Q Autoguide systems for cars



Q Aerodynamic 'artics'

Q Monster supertankers

Q Motorways in the sky

Q Harnessing animal power

Q Fuels from animal waste

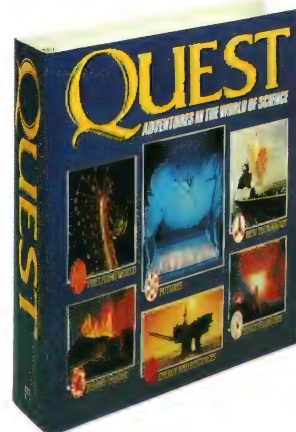
Q Bicycle styles

Q The container revolution

TRANSPORT 12.

QUEST

CONTENTS 12



PLANET EARTH

CARGO CARRIERS

37-40

The container revolution – ultra-large crude carriers – ro-ro ships – pitch propellers – sinking ships

THE LIVING WORLD

BRUTE STRENGTH

41-42

Draught and pack animals – horse power – harnessing oxen – two types of camel – domesticated elephants



NEW TECHNOLOGY

SKY LINERS

71-74

Motorways in the sky – aircraft 'stacks' – instrument landing systems – baggage handling – security – electric scanners – hypersonic aircraft

HIGH-TECH ARTICS

75-76

A home from home – self-adjusting disc brakes – lightweight cabs – rubber suspensions – computerized gearboxes – electronic brakes



FUTURES

SPEEDING AHEAD

45-48

Tomorrow's car – autoguide system – fuel injection system – super railways – high-speed trains



ENERGY AND RESOURCES

FUELS OF THE FUTURE

35-36

Oil refineries – methane from manure – cheaper, cleaner fuels – unleaded petrol – lean burn engines – dangers of carbon monoxide

PEDAL POWER

37-40

Human horsepower – aerodynamic frames – moulded plastic wheels – derailleur gears – carbon fibre wheel rims

Pack cover: supersonic Sanger plane (MBB-ERNO); time trialling bike (Photosport International), the Channel Tunnel (Channel Tunnel Group Ltd. **Fact file cover:** Ford's prototype car (Ford); visual control room at Heathrow Airport, London

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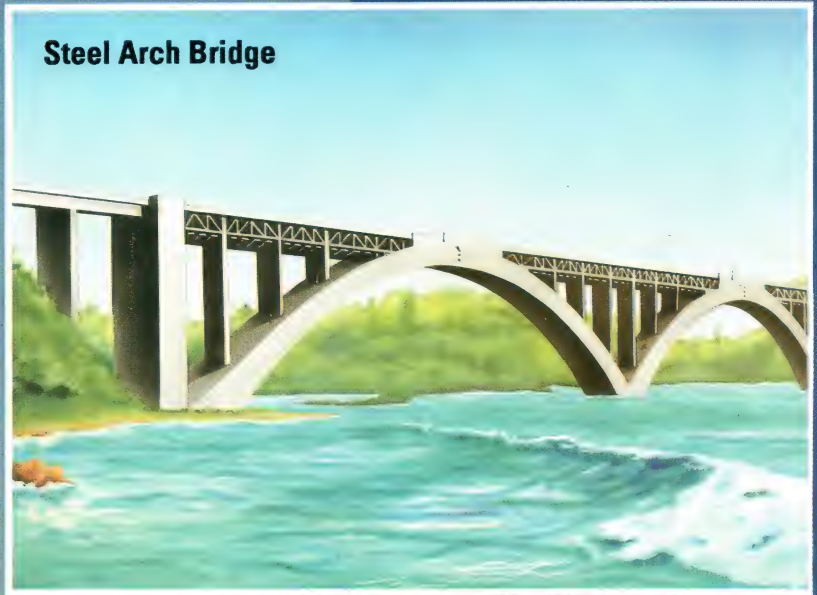
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QUEST

ADVENTURES IN THE WORLD OF SCIENCE

Steel Arch Bridge

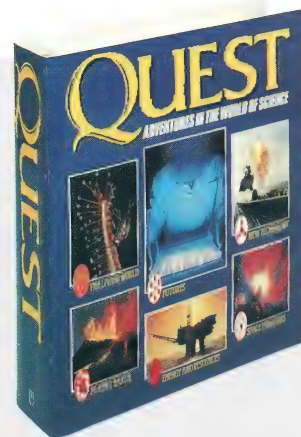


- ❑ Space structures
- ❑ Blasting through rock
- ❑ Artificial islands
- ❑ Pile drivers and mega cranes
- ❑ Are skyscrapers safe?
- ❑ Webs and nests
- ❑ Suspension bridges
- ❑ Cement plants and concrete makers

CONSTRUCTIONS 13

QUEST

CONTENTS



PLANET EARTH

WATER BARRIERS

41-42

Types of dam – water pressure – dam disasters – importance of sluices – harbour walls – barrages and locks – strengthening cliffs

BRIDGES AND TUNNELS

43-46

Single-span and suspension bridges – underwater support – load-bearing arches – blasting tunnels

SEA STRUCTURES

47-48

Offshore platforms – huge floating structures – giant crane barges – buoyancy tanks

THE LIVING WORLD

NATURE'S ARCHITECTS

43-44

Ingenious structures – controlled environments – air conditioning – natural materials – sewing and weaving – chimney spires



NEW TECHNOLOGY

SKYSCRAPERS

77-80

Gravity and wind pressure – support structures – controlling sway – safety factors – fighting fire – automatic sprinkler systems

MEGA MACHINES

81-82

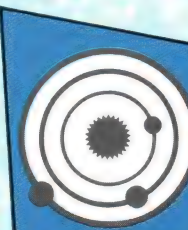
Pile drivers – giant drills – high-power pumps – telescopic cranes – pumping concrete

SPACE FRONTIERS

ASTROSTRUCTURES

19-20

Advantages of weightlessness – modules for space stations – using robots – welding in space



ENERGY AND RESOURCES

TODAY'S MATERIALS

41-44

Versatile cement – shaping structural steel – lightweight building blocks – stress grading timber



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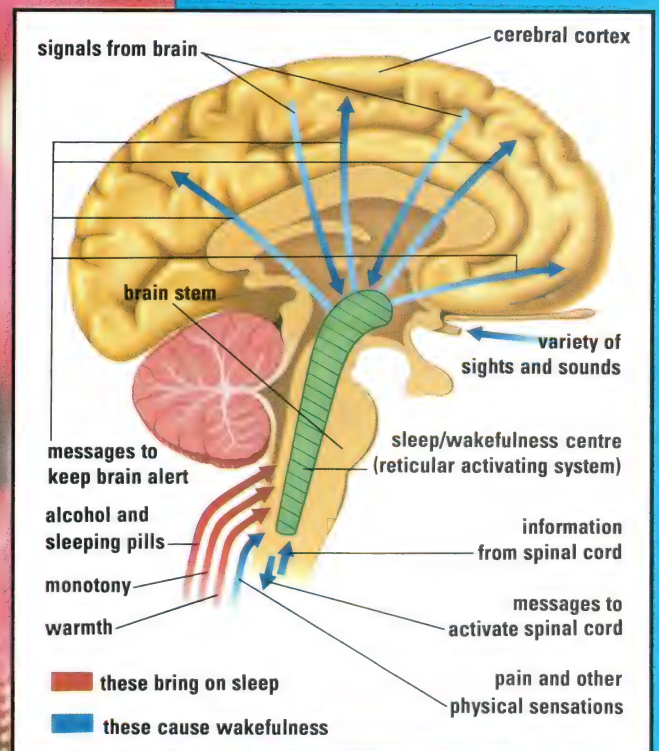
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Pack cover: view of Toronto, Canada, from the world's tallest freestanding structure – CN Tower; artist's impression of the space station 'Freedom', The Thames Barrier, London, England (Alex Bartal/Science Photo Library). **Fact file covers:** the 552 metre high CN Tower; steel arch bridge

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- ☐ Anatomy of a nerve cell
- ☐ Disorders and diseases
- ☐ Investigating the paranormal
- ☐ The vital nervous systems
- ☐ How the mind works
- ☐ Disorientation methods
- ☐ The nature of intelligence



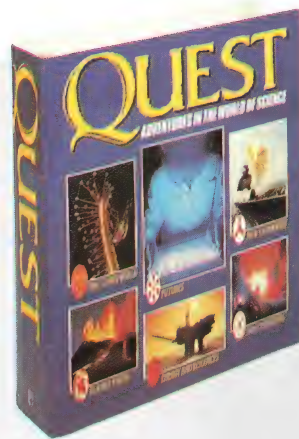
- ☐ Control centres in the brain

BRAIN POWER

14

QUEST

CONTENTS 14



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PLANET EARTH

MIND OVER MATTER

49-50

The paranormal – controlled experiments – hypnotism – acupuncture – spiritual healing – dowsing

THE LIVING WORLD

THE DEVELOPING BRAIN

45-48

Early man – the embryonic brain – brain size – factors affecting development – importance of stimulation – early learning

WHIZZ KIDS

49-50

Different types of intelligence – creative thinking – lateral thinking – mental age – intelligence tests – child prodigies – I.Q.

NEW TECHNOLOGY

IMBALANCES

83-86

Brain chemistry – neurotransmitters – electrical impulses – the body's drugs – blood-brain barrier – diseases and disorders

BRAINWASHING

87-88

Sensory deprivation – white noise – disorientation rooms – hooding – chemical drugs – resistance techniques

FUTURES

ELECTRONIC BRAINS

49-52

The latest computers – memory chips – microprocessors – robots – three-D graphics – modern music synthesizers and sequencers – speech recognition systems

ENERGY AND RESOURCES

MIND AND BODY

45-48

Structure of the brain – two nervous systems – function of nerve cells – transmitting electrical impulses – synapses – the vital spinal cord

Pack cover: a three-D scan of the skull and brain (main image); piano-playing robot (right).

Fact file cover: a mystic stuck with skewers and hooks; diagram of the BAS (the

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- Q Making banknotes from jeans
- Q Extracting precious metals



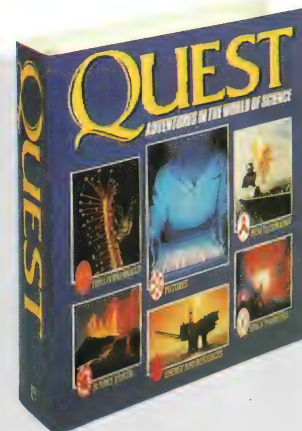
- Q The latest 'smart' card
- Q Oil wealth
- Q Plastic money
- Q Computerized trading systems
- Q Dealing round the clock

MONEY

15

QUEST

CONTENTS 15



PLANET EARTH

THE EARTH'S RICHES

51-54

What coins are made of – distribution of precious and base metals – mining – extracting copper by electrolysis

THE LIVING WORLD

TRADING ON THE FUTURE

51-52

'Hard' and 'soft' commodities – modern computerized trading systems – speculation – price monitoring



NEW TECHNOLOGY

HI-TEC SELLING

89-92

The International Stock Exchange – electronic dealing systems – up-to-date information services – the 'Big Bang'

SLOT MACHINES

93-94

Hi-tec machines – coin-operated units – detecting fake coins – light sensor scan for notes – ticket machines that give change

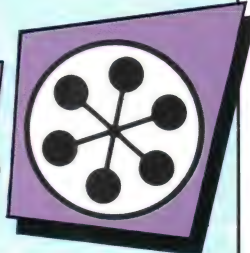


FUTURES

SMART MONEY

53-56

Paying with plastic – microcomputers in cards – automated cash dispensers – the latest 'smart card'



ENERGY AND RESOURCES

MINTING AND PRINTING

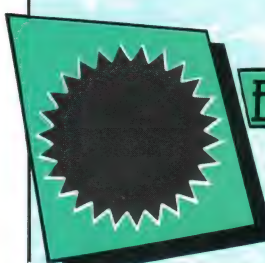
49-52

Foiling forgers – casting and cutting metal alloys – turning 'blanks' into finished coins – making banknote paper – printing processes – security threads

BLACK GOLD

53-54

Petroleum – fuels from oil – paying in petrodollars – oil production – developing new oil fields



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Pack cover: the bright lights of Las Vegas – gambling capital of the USA (T. Wood/Stock photos); a wheel of assorted credit, charge and debit cards. **Fact file front cover:** International gold coins and bars (ZEFA); diagram of a cash dispenser. Back of pack: The photo of the hologram on the back of the pack is by Philippe Plailly/SPL.

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ADVENTURES IN THE WORLD OF SCIENCE

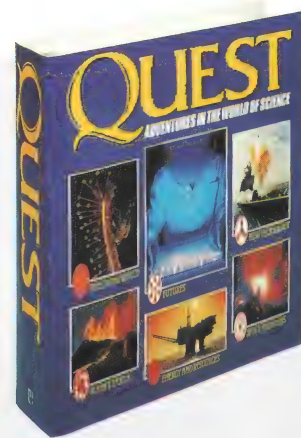
- Q Pictures from Space
- Q High-capacity optical discs
- Q Refraction and defraction
- Q Mirages and false perspectives
- Q Photographic reductions
- Q How animals see
- Q Bouncing light
- Q Laser surgery



LIGHT AND IMAGES 16

QUEST

CONTENTS 16



THE LIVING WORLD

VISION

53-56

Light-sensitive cells – the optic nerve – bipolar cells – many-faceted eyes – multi-focal lenses – 'seeing' heat

OPTICAL ILLUSIONS

57-58

How a mirage occurs – refraction of light – the illusion of movement – visual 'fatigue' – false perspectives – stereoscopes – 3-D films and pictures

NEW TECHNOLOGY

LASERS – HIGH ENERGY LIGHT

95-98

Electromagnetic radiation – how lasers work – different frequencies and colours – a high-precision surgical tool – vaporizing tumours – killer rays

MOVING PICTURES

99-102

Cine cameras – frame speed and size – projecting the image – revolving shutters – flicker rate – high-resolution films – big screen systems



SPACE FRONTIERS

IMAGES FROM SPACE

21-22

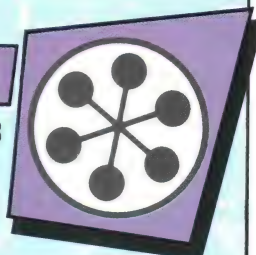
New generation Space telescopes – mega mirrors – giant receivers – false colour images – ultraviolet radiation – microwave radiation

FUTURES

MICRO IMAGES

57-58

Digitized information – imprinting with lasers – cards with memory chips – optical discs for computers – putting libraries on disc – microfilm – photographic reduction



ENERGY AND RESOURCES

UNDERSTANDING LIGHT

55-58

The electromagnetic spectrum – converting light into energy – refraction and defraction – photons – speed of light – splitting light – photosynthesis

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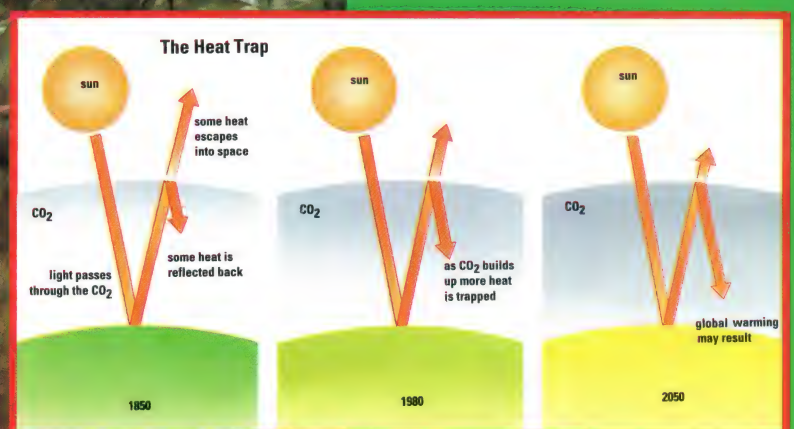
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QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- Life in the canopy
- How curare works
- Carnivorous plants
- Tribal rites
- Expeditions into the unknown
- The hazards of building dams and highways
- Yellow – the danger sign
- The consequences of deforestation



INTO THE JUNGLE 17

QUEST

CONTENTS 17



PLANET EARTH

INTO THE UNKNOWN

55-58

Expeditions – heat and humidity – dangerous insects – weird meals

THE GREENHOUSE EFFECT

59-60

Photosynthesis – respiration – build up of CO₂ – deforestation

THE LIVING WORLD

THE TROPICAL FOREST

59-60

Layers of vegetation – fighting for light – soil structure – adaptations

PLANT POWER

61-62

Carnivorous plants – flowers that stink – parasites – snares and traps

WILDLIFE

63-64

Danger signs – camouflage – fierce hunters – venomous snakes



NEW TECHNOLOGY

FACTORIES OF THE FOREST

103-106

Logging techniques – tapping latex – building highways and dams – cooling concrete – aerial maps

LIVING LABORATORY

107-108

Plant tonics and painkillers – how curare works – cancer treatments – infusing plants – laboratory analysis – synthetic drugs



FUTURES

GENE BANK

59-60

Creating new life forms – genetic variations – disease-resistant crops – the vital 'wildtype'

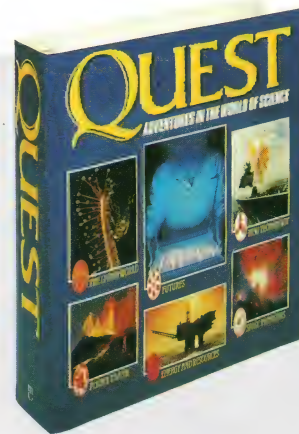


ENERGY AND RESOURCES

FARMING THE JUNGLE

59-60

Turning forest into pasture – slash and burn agriculture – indicator plants – changes in the soil



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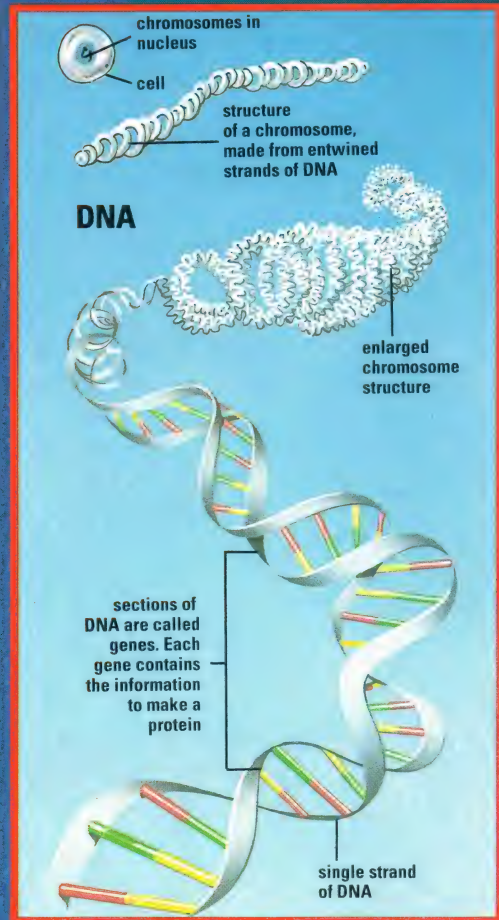
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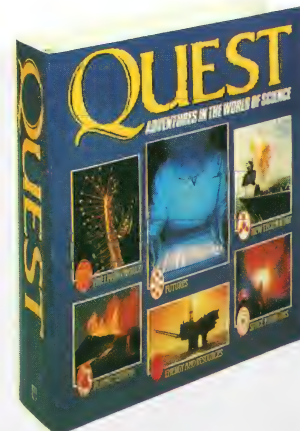
ADVENTURES IN THE WORLD OF SCIENCE



- ☐ What makes you unique
- ☐ Sending out sex signals
- ☐ A new star in space
- ☐ Atoms – the essence of everything on earth
- ☐ Continuation of the species

QUEST

CONTENTS 18



PLANET EARTH

DNA – MOLECULE OF LIFE

61–62

Nature's computer discs – character dictating genes – the genetic code – mutations and diseases

BONDING

63–64

Anatomy of an atom – molecular chains – protons and neutrons – orbiting electrons – hydrogen atoms

THE LIVING WORLD

REPRODUCTION

65–68

Cell divisions – daughter cells – binary fission – bacteria and simple cell organisms – identical offspring

SEXUAL CHEMISTRY

69–72

Sexy scents and signals – courtship behaviour – releasing sex hormones – fertilizing eggs



NEW TECHNOLOGY

BIOTECHNOLOGY

109–110

New plants from cuttings – growing plants in jelly – cloned plantations – creating disease-resistant plants

GENETIC ENGINEERING

111–112

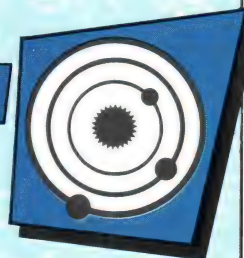
Extracting insulin – transferring genes – modifying bacteria – microinjections – Factor IX – transgenic sheep

SPACE FRONTIERS

STAR BIRTH

23–24

Nuclear transformation – the importance of cosmic dust – stellar shock waves – proto-stars – violent births – killer viruses from outer space

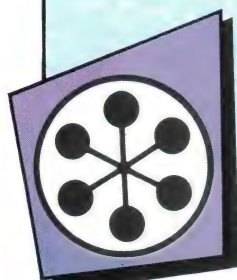


FUTURES

HI-TECH SEX

61–64

Artificial insemination – freezing sperms – fertility drugs – test-tube babies – selective breeding – embryo implantation



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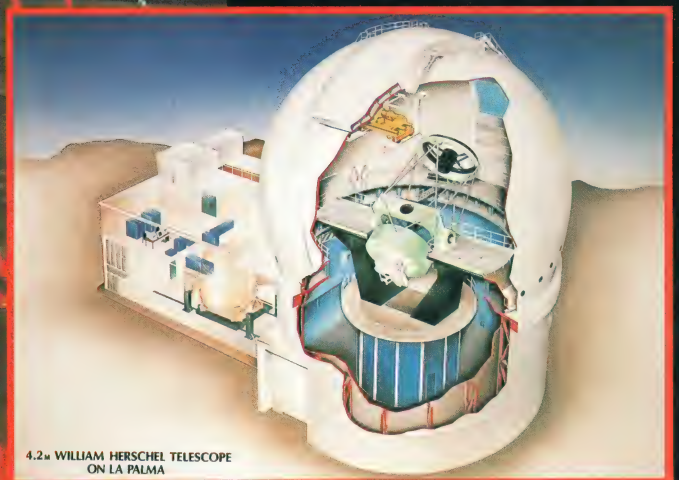
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Pack cover: seedlings growing in test tubes; identical twins (Gamma/Frank Spooner Pictures). **Fact file cover:** false colour photo of Comet Bennett, 1970; a single strand of DNA unravelled.

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- Telling the age of planet Earth
- The meaning of death
- The birth and death of the Universe
- Clocks that measure microseconds
- How animals' tell the time
- Freezing a moment for ever
- Time travel – is it possible?



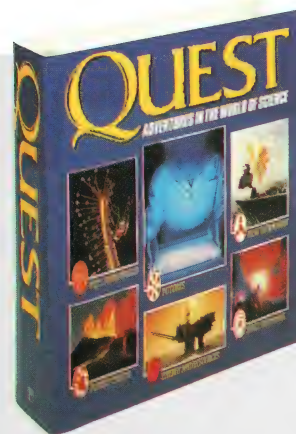
4.2m WILLIAM HERSCHEL TELESCOPE
ON LA PALMA

TIME

19

QUEST

CONTENTS 19



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PLANET EARTH

ROCKS OF AGES

65-68

Rock strata – upheavals in the Earth's crust – irregular layers – fossils – modern methods of dating – clues from pottery

THE LIVING WORLD

BIOLOGICAL CLOCKS

73-76

Internal clocks – lunar cycles – daily rhythms – biorhythms – effects of shift work – jet lag

AGEING

77-80

Life expectancy – comparative lifespans – the oldest living plant – theories of ageing – effects of growing old – death of brain cells



NEW TECHNOLOGY

SPLITTING SECONDS

113-114

The first clock – the Earth's rotation – variable days – measuring time – pendulums – quartz crystals – super-accurate atomic clocks

CAUGHT IN ACTION

115-116

Capturing action on film – shutter speeds – revolving-prism camera – one million frames per second – time-lapse photography

SPACE FRONTIERS

WHEN TIME BEGAN

25-28

Zero time – creation – the Big Bang – atoms form – expansion and contraction of the Universe – birth of the first stars – black holes

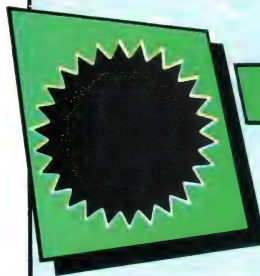


FUTURES

TIME TRAVEL

65-66

Travelling into the future – the speed of light – when time slows down – time 'dilation' – changes in length and mass



QUEST

ADVENTURES IN THE WORLD OF SCIENCE

- Q The force to move mountains
- Q When dirty water spells danger
- Q Fighting pain with water
- Q How a hydroelectric power plant works
- Q The salt of the Earth
- Q Safeguarding the water we drink

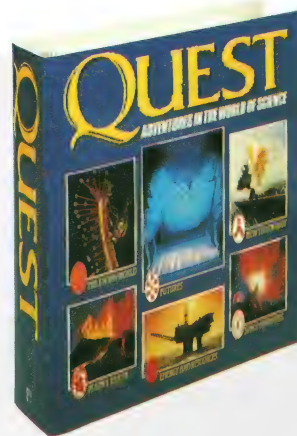
Arctic Icebreaker



WATER OF LIFE 20

QUEST

CONTENTS 20



PLANET EARTH

FANTASTIC FLUID

69-72

Atomic reactors – contraction and expansion – freezing and boiling points – glaciers and icebergs – sound underwater – SONAR

TAKING THE PLUNGE

73-76

Hot and cold packs – the Jacuzzi – why swimming is good for you – 'wet and wild' rides – a surge of adrenalin – bellyflopping with confidence

THE LIVING WORLD



MICROSCOPIC LIFE

81-82

Contaminated water – effects of cholera and typhoid – how bacteria multiply – cause of legionnaire's disease – plankton – ways of sterilizing water

NEW TECHNOLOGY



WATERWORKS

117-118

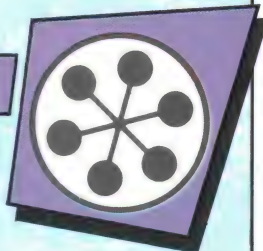
River pollution – legal controls – reservoirs full of fish – chlorine in tap water – solid waste – the sewage works – some uses for sludge

FUTURES

WATER POWER

67-70

Hydroelectric plants – the world's tallest dam – reaction and impulse turbines – the force of the waves – hydrogen-fuelled rockets – quicksand



ENERGY AND RESOURCES

EXPLOITING SALT WATER

61-62

The sea's salt balance – salt lakes and dead seas – flash distillation – salt water crops – salt depletion

THE WATER CYCLE

63-66

Rain, hail and snow – transpiration and evaporation – aquifers – dangers of flooding – too much salt

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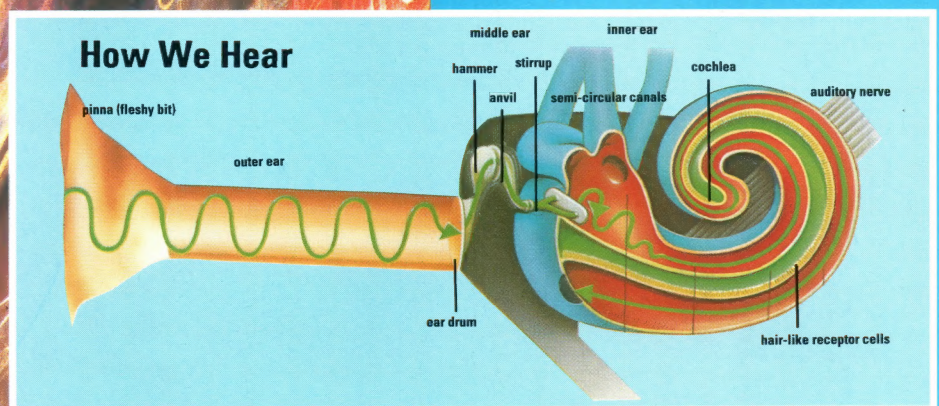
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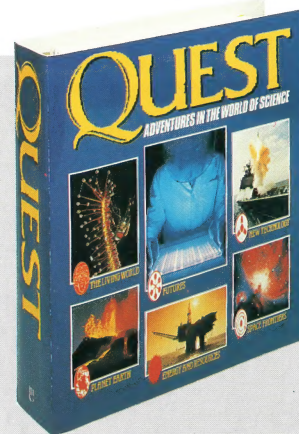
- ❑ Breaking the sound barrier
- ❑ Pure notes
- ❑ Journey of a soundwave
- ❑ What makes up sound?
- ❑ Stretching sound



- ❑ How pop videos are made
- ❑ Our own auditory system

QUEST

CONTENTS 21



PLANET EARTH

MAKING MUSIC

77-80

Recognising music – pure tone – different instruments – sine waves – harmonies – resonance – pitch and timbre – shape and materials

THE LIVING WORLD

TUNING IN – HOW WE HEAR

85-88

Compression waves – analysing sound and music – inside the ear – three zones of the ear – interpreting nerve signals – how insects hear – ultrasonic sound – night 'vision' – reflected sound



NEW TECHNOLOGY

MAKING TRACKS

119-122

The recording studio – pilot tracks – synchronising tracks – overdubbing – the mixing desk – adding reverb – digital delays – echoes – chorusing

POP VIDEOS

123-124

Special effects – combining images on one frame – digital effects – background colour – vision mixing – stretching and shrinking shapes

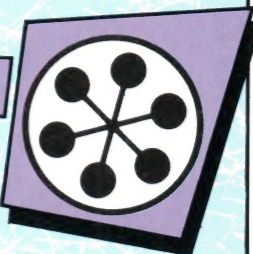


FUTURES

SYNTHETIC SOUND

71-74

Synthesizers – samplers – sequencers – individual composition – MIDI linking system – layers of sound – volume control

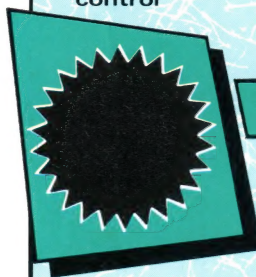


ENERGY AND RESOURCES

SOUND VIBRATIONS

67-68

Sound energy – regular vibrations – sine waves: pure sound – pitch and volume – breaking the sound barrier – ultrasound – shattering glass



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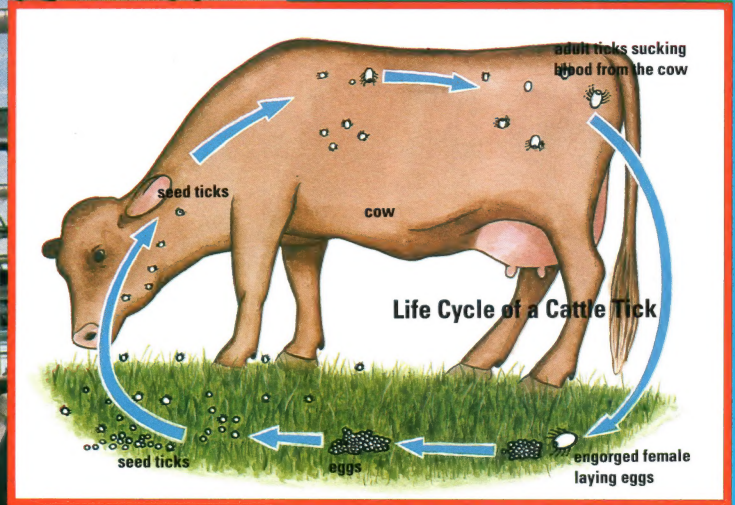
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Pack cover: A 24-track mixing desk in a recording studio; Algerian horn blower (Robert Harding Picture Library). **Fact file cover:** time-lapse photograph of light reflecting off a saxophone; our hearing system (inset).

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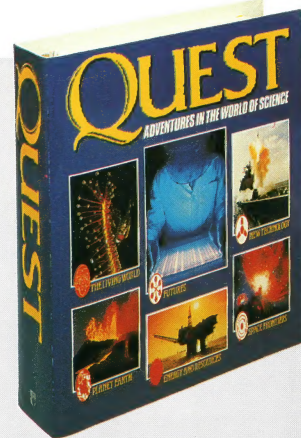
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FARMING

22

QUEST

CONTENTS 22



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PLANET EARTH

FOOD AID

81-82

Shortages and surpluses — unequal distribution — the 'Green Revolution' — growing crops for cash — new solutions to old problems

GREENING THE DESERT

83-84

Irrigation — centre pivot systems — giant revolutions — low pressure methods — harvesting water — fuel and fodder projects

THE LIVING WORLD

PEST CONTROL

89-92

Machines that destroy pests — chemicals that kill them — spraying crops — inoculating animals — side effects of pesticides — polluting the food chain

NEW TECHNOLOGY

FACTORY FARMING

125-128

Computerised feeding systems — mass chicken coops — 'forcing' animal growth — breeding leaner pigs — 'bringing on' crops — earlier harvests

INDOOR FIELDS

129-130

Growing plants without soil — huge hydroponic installations — macronutrients — monitoring nutrient levels — higher yields — artificial sunshine

SPACE FRONTIERS

ASTRO AGRICULTURE

29-30

Prototype Space-farms — the endless days implications of lack of gravity — water from Moon rocks — Biosphere II

FUTURES

FUTURE FARMING

75-76

Automation — test-tube crops — tissue culture — growing cotton in the laboratory — the super soy bean

ENERGY AND RESOURCES

AQUACULTURE

69-72

Farming the seas — overfishing — creatures from the deep — salmon and oyster farms